I claim:

1. A method for controlling one or more properties of a sheet of material to be manufactured on a sheet-making machine that includes a plurality of actuators to control the sheet properties arrayed in a cross-direction of the machine comprising the steps of:

measuring properties data about the one or more properties of the sheet of material; and

manipulating both the magnitude of each actuator control action and the cross-direction shape of each actuator control action to minimize the variation of the measured properties data from a desired target for each of the one or more properties.

2. The method as claimed in claim 1 in which the step of measuring properties data is done by a plurality of scanners.

3. The method as claimed in claim 1 including the step of communicating the measured properties data to a controller.

4. The method as claimed in claim 3 including the step of calculating the control actions at the controller to communicate to each of the actuators.

5. The method as claimed in claim 4 in which the step of measuring properties data is performed at regular intervals to provide feedback to the controller with respect to previous control actions.

6. The method as claimed in claim 5 in which the step of calculating control

actions involves calculating a first control action that permits variation of the magnitude of the actuator response and a second control action that permits variation in the cross-directional shape of the actuator response.

7. The method as claimed in claim 6 in which the first and second control actions are communicated to each actuator as first and second setpoints for each actuator.

8. The method as claimed in claim 6 in which the step of calculating control actions is performed taking into account actuator characteristics.

9. The method as claimed in claim 6 in which the step of calculating control actions is performed taking into account sheet characteristics.

10. The method as claimed in claim 1 in which each actuator comprises a steam actuator having an outlet chamber for releasing steam to the sheet of material, and the step of manipulating the cross direction shape of the actuator control action comprises manipulating the cross-direction position and dimensions of the outlet chamber.

11. The method as claimed in claim 10 in which the outlet chamber includes at least one movable baffle plate within the outlet chamber, and manipulating the cross-direction position and dimensions of the outlet chamber comprises moving the at least one movable baffle plate.

12. The method as claimed in claim 1 in which each actuator comprises a steam actuator having an outlet chamber for releasing steam to the sheet of material including a screen plate with openings therethrough covering the outlet chamber and at least one movable plate, and the step of manipulating the cross-direction shape of

the actuator control action comprises moving the at least one movable plate with respect to the screen plate to fully or partially obstruct the openings in the screen plate.

13. The method as claimed in claim 1 in which each actuator comprises a steam actuator having an outlet chamber for releasing steam to the sheet of material including at least one air jet associated with the outlet chamber, and the step of manipulating the cross-direction shape of the actuator control action comprises discharging the air jets to control the steam dispersal.

14. The method of claim 1 in which each actuator comprises a nozzle for delivering water atomized by air pressure to the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the air pressure at the nozzle.

15. The method of claim 1 in which each actuator comprises a nozzle for delivering water atomized by air pressure to the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the air flow at the nozzle.

16. The method of claim 1 in which each actuator comprises a nozzle for delivering water atomized by air pressure to the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the position of a water discharge opening of the nozzle with respect to an air discharge opening of the nozzle.

17. The method of claim 1 in which each actuator comprises an induction heating coil for heating at least one of a pair of rolls to change the diameter of the at least one roll in order to vary the gap between the pair of rolls and thereby the thickness of a

sheet of material passing between the rolls with each heating coil having multiple windings for generating magnetic fields, and the step of manipulating the cross-direction shape of the actuator control action comprises controlling the current to the windings.

18. The method of claim 1 in which each actuator comprises an induction heating coil for heating at least one of a pair of rolls to change the diameter of the at least one roll in order to vary the gap between the pair of rolls and thereby the thickness of a sheet of material passing between the rolls with each heating coil being mounted for pivotable movement, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the angle of the heating coil.

19. The method of claim1 in which each actuator comprises an array of infrared heating lamps for heating the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises controlling the voltage of each heating lamp.

20. The method of claim 1 in which each actuator comprises a gas-fired infrared emitter matrix for generating infrared radiation to heat the sheet of material, the emitter matrix being heated by combusting gas and having screen plates with openings therethrough adjacent the emitter matrix, and the step of manipulating the cross-direction shape of the actuator control action comprises moving the screen plates with respect to each other to fully or partially align or misalign openings in the screen plates thereby controlling the gas supply to the emitter matrix.

21. A system for controlling one or more properties of a sheet of material to be manufactured on a sheet-making machine comprising:

a plurality of actuators distributed in the cross-machine direction over the

sheet of material that are controllable to vary the properties of the sheet of material by varying both the magnitude of the actuator response and the cross-directional shape of the actuator response;

scanners distributed over the sheet of material to measure properties data about the properties of the sheet of material;

a controller in communication with the scanners for calculating control actions for each of the plurality of actuators and implementing appropriate control actions at the actuators such that the actuators co-operate to adjust the properties of the sheet of material to desired targets.

22. The system of claim 21 in which each actuator comprises a steam actuator having an outlet chamber for releasing steam to the sheet of material with the cross-direction position and dimensions of each outlet chamber being manipulatable to control the cross-direction shape of the actuator response.

23. The system of claim 22 in which the outlet chamber of the steam actuator includes at least one movable baffle plate which is movable to control the cross-direction position and dimensions of the outlet chamber.

24. The system of claim 21 in which each actuator comprises a steam actuator having an outlet chamber for releasing steam to the sheet of material and including a screen plate with openings therethrough covering the outlet chamber and at least one movable plate, such that moving the at least one movable plate with respect to the screen plate acts to fully or partially obstruct openings in the screen plate.

25. The system of claim 21 in which each actuator comprises a steam actuator having an outlet chamber for releasing a flow of steam to the sheet of material

including at least one air jet associated with the outlet chamber dischargable to control the shape of the steam flow.

26. The system of claim 21 in which each actuator comprises a nozzle for delivering a water spray atomized by air pressure to the sheet of material including means for adjusting the air pressure at the nozzle to control the shape of the water spray.

27. The system of claim 21 in which each actuator comprises a nozzle for delivering a water spray atomized by air pressure to the sheet of material including means for adjusting the air flow at the nozzle to control the shape of the water spray.

28. The system of claim 21 in which each actuator comprises a nozzle for delivering a water spray atomized by air pressure to the sheet of material, the nozzle having an water discharge opening and an air discharge opening that are adjustable by position with respect to each other to control the shape of the water spray.

29. The system of claim 21 in which each actuator comprises an induction heating coil for heating at least one of a pair of rolls to change the diameter of the at least one roll in order to vary the gap between the pair of rolls and thereby the thickness of a sheet of material passing between the rolls with each coil having multiple windings for generating magnetic fields whereby controlling the currents to each of the multiple windings controls the cross-direction shape of the actuator response.

30. The system of claim 21 in which each actuator comprises an induction heating coil for heating at least one of a pair of rolls to change the diameter of the at least one roll in order to vary the gap between the pair of rolls and thereby the thickness of a sheet of material passing between the rolls, each heating coil being

mounted for pivotable movement whereby adjusting the angle of the heating coil controls the cross-direction shape of the actuator response.

31. The system of claim 21 in which each actuator comprises an array of infrared heating lamps for heating the sheet of material whereby controlling the voltage of each heating lamp controls the cross-direction shape of the actuator response.

32. The system of claim 21 in which each actuator comprises a gas-fired infrared emitter matrix for generating infrared radiation to heat the sheet of material, the emitter matrix being heated by combusting gas and having screen plates with openings therethrough adjacent the emitter matrix, whereby moving the screen plates with respect to each other to fully or partially align or misalign openings in the screen plates acts to vary the gas supply to the emitter matrix to control the cross-direction shape of the actuator response.

33. The method as claimed in claim 1 in which each actuator comprises a motor for controlling the position of a slice lip mounted to a head box, and the step of manipulating the cross direction shape of the actuator control action comprises manipulating the global position of the slice lip.